US006282547B1

(12) **United States Patent**
Hirsch

(10) **Patent No.: US 6,282,547 B1**
(45) **Date of Patent: Aug. 28, 2001**

(54) **HYPERLINKED RELATIONAL DATABASE VISUALIZATION SYSTEM**

(75) Inventor: **Peter Douglas Hirsch**, Danville, CA (US)

(73) Assignee: **Informix Software, Inc.**, Menlo Park, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/139,793**

(22) Filed: **Aug. 25, 1998**

(51) **Int. Cl.**[7] **G06F 17/30**
(52) **U.S. Cl.** **707/102**; 345/346; 345/356; 345/357; 717/1; 707/501
(58) **Field of Search** 707/102–103, 707/1–6, 501, 513, 104; 345/356, 357, 340–341, 346; 705/8–10, 36–37; 717/1, 11

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,603,025		2/1997	Tabb et al.	707/2
5,796,932	*	8/1998	Fox et al.	1/1
5,850,548	*	12/1998	Williams	395/701
5,893,125	*	4/1999	Shostak	707/511
6,014,138	*	1/2000	Cain et al.	345/335

OTHER PUBLICATIONS

"Zoomin and Tunneling in Tioga: Supporting Navigation in Multidemensional Space," Woodruff et al., Proceedings of the 1994 IEEE Symposium n Visual Languages, Oct. 4–7, 1994, pp. 191–193.*

"Tioga–2: A Direct Manipulation Database Visualization Environment," Aiken et al., Proceedins of the 1996 Twelfth International Conference on Data Engineering. Feb. 26–Mar. 1, 1996, pp. 208–217, IEEE.*

Peter Wright, "Working with Visual Modeler," Beginning Visual Basic 6 Objects, Wrox Press Ltd., 398–433.

* cited by examiner

Primary Examiner—Hosain T. Alam
(74) *Attorney, Agent, or Firm*—Fish & Richardson P.C.

(57) **ABSTRACT**

A computer operated apparatus for generating a visual information system is disclosed. A virtual world associated with an application is built using building blocks such as scenes, data sources, global parameters, and resources. A scene is a visual display of information much like a presentation slide, except that the information may be linked to data stored in a database or other data storage systems. Within a scene, values resulting from a data source are represented graphically as user-defined data elements. Data sources are built with a block diagraming tool which generates one or more database queries. The queries may be SQL queries. Scenes are created with a drawing editor which transparently binds data sources to the graphical elements of the scenes. When the virtual world is completed, an execution image of the virtual world may be represented as byte code. The byte code representing the virtual world may be executed by a runtime control to provide desired information to users.

24 Claims, 16 Drawing Sheets